ance of the reindeer, that is, with the end of the palæontological age, and with the commencement of the present epoch of geologists. It likewise coincides with a complete change in the social condition of man, with the domestication of the dog, with pastoral life, marked by the domestication of several herbivora, and soon after with agriculture. A long succession of ages then elapsed, until the appearance of bronze, which put an end to the Stone Age. The epoch of polished stone was therefore a very long one ; compared to this the whole period of historic time sinks into insignificance : nevertheless, this period of polished stone, however long it may appear to us, was infinitely shorter than any of those of which the epoch of hewn stone is composed.

(*To be continued.*)

THE ITALIAN REPORT UPON THE ECLIPSE OF 1870[*]

THIS is a folio volume about an inch thick, in a yellow paper cover. It is a well-printed book, made of tolerably good foolscap, and as the title-page informs us, produced at the expense of the Italian Government, under the care of Prof. Sir G. Hunter, as we should call him, but in his native tongue, Il Cavaliere Professore G. Cacciatore[†] ; and the first remark that occurs to one on looking through it is that whether the Government paid handsomely, or whether it gave with a grudging stinginess, its cash was at all events well laid out, alike without extravagance and without meanness, and that the result reflects honour upon Italy.

On dipping into its contents here and there in a cursory way, the next thing you notice is the eager interest which the several contributors seem to take in their work, and the earnest simplicity with which they recount their experiences and achievements.

Speaking generally, the volume is a picture-book ; the plates, some of them distributed through the letterpress, but accumulated in a considerable mass at the end, form an important feature of it, and will be found very interesting and suggestive even to those who are not so fortunate as to read the text.

For the convenience of the latter class of persons, I propose now to give a slight sketch of the report, beginning at the preface, and describing the several papers in the order in which they occur ; and if, whilst doing so, I should venture to make any comments, the reader must remember not to attach too much weight to them, because it is hardly possible for a foreigner to do justice to men whose words and ways must always bear from his point of view something of the interest proper to pictures by the old masters. I ought not to presume to review this book critically, because, in the first place, the chief performers concerned in it are in every way my superiors ; and in the second place, I am obliged to confess at once that they are personally so vividly present in my memory, that it seems almost a rudeness to analyse their writing for public uses.

I find it impossible to eliminate the romantic charm of their manners, and my own recollections of the high courtesy they showed towards us when we were associated with them in Sicily.

A slight reflection of this latter will be perceived by the reader the first time he opens the book. Fronting the title-page he will find a lithographed drawing of the station at Augusta, purporting to show the several observatories, in which those of the Italian astronomers are shown in the background ; whilst the rough shed of the English observers, and the tents in which they were encamped, form the most prominent features of the picture. In passing from this first page of the volume, I must testify to the singular faithfulness of the drawing.

After the title-page there occurs a short paragraph, consisting of Prof. Cacciatore's apology for the delay in the production of the Report. (By the way, I wonder what our unfortunate editor will say in this respect when, after we are all dead and turned to dust, he produces at his own untold expense the English report of the same eclipse as an astronomical curiosity ! Is not that a rather pathetic and suggestive reflection ?)

Next follows the index, and then an address to the Minister of Public Instruction, from which it appears that a royal decree of July 5 of the year previous to the eclipse appointed a Commission consisting of Professors Cacciatore, De Gasparis, Donati, Santini, and Schiaparelli "to draw up a programme of the observatories, and to appoint the persons, the instruments, and whatever might be considered necessary to the success of the enterprise" ; and of this Commission, Prof. Santini of Padua, was appointed president, and Prof. Cacciatore, of Palermo, vice-president. This address is signed by Santini, and recounts further how the Commission assembled in Florence in September 1869, and added to its numbers Professors Padre Secchi and Pietro Blaserna, of which, and of all its other proceedings, the Minister had been kept informed. Santini goes on to say that his present duty is to express the thanks that Science owes to that official for the eagerness he showed in backing them up with a considerable augmentation of the fund originally appropriated, and getting placed at their disposal a Royal steamship, and so on.

He then says that, owing to his advanced age, the chief burden of the work fell to the lot of Cacciatore, and that, thanks to his careful diligence, and so on, things were got ready nearly as intended ; the "nearly" being a consequence of the extraordinary political changes of the preceding year. Cacciatore however seems to have found it no joke, and the part confided to him, he says, was very arduous and rugged ("ben ardua e scabrosa").

Here follows Cacciatore's account (*relazione*) of all that he did, and it forms, perhaps, the most interesting chapter of the whole book. The rest of the observers pass before the reader in single file, each relating what he saw and did, in his own words ; but Cacciatore gives us a peep behind the scenes, and tells us what was done in the way of preliminary arrangement, and how he tried to aid every man in the manner best calculated to develope his own particular abilities ; and in these operations (if I may be allowed to pass a remark) he appears to have done his work in a masterly way ; and he relates the story with a graceful facility that makes it most attractive reading. He describes his preliminary canter over the course of the totality in search of a suitable site for the observatories ; tells how he first examined the neighbourhoods of Villa 'Smunda and Terranova, as affording beyond all doubt the most favourable conditions, and how he afterwards reluctantly abandoned the former on account of its unhealthiness, and fell back on Augusta for his chief station, the fortress of which he describes, and says he found it admirably adapted for the purpose. Most truly it was so ; and if I were to give an account of it, I should find Cacciatore's allowance of adjectives very inadequate to convey my impression of its attractions, although December was by no means the month in which they could be fairly appreciated.

Leaving his colleague, Tacchini, there to make preparations, he returned to his observatory at Palermo, which formed the base of operations. After this he gives a summary of the instruments, the observers, and the *role* assigned to each, and tells how he marshalled them in two complete and independent divisions, one of them destined for Augusta and the other for Terranova. On November 25 the steamer *Plebiscito* cast anchor at Palermo, having picked up on her way from Genoa certain members of the expedition, with their instruments, and on the 27th they got under weigh again and proceeded to the east coast of the island, where they admired the scenery, and where their otherwise considerate and polite captain, Il Cavaliere Foscolo, strangely neglected the opportunity of running them ashore.*

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[*] Raporti sulle osservazioni dell'Eclisse totale di Sole del 22 Dicembre, 1870, eseguite in Sicilia dalla commissione Italiana.

[†] He always signs himself G. Cacciatore, but his first name is Gaetano.

Arriving thus at their citadel, nearly a month in advance, and finding that ample preparations had already been made, they were now in a position to devote themselves quietly to their own particular pursuits, and to carry on their experiments with reference to the important occasion. However, they were no sooner comfortably settled than their troubles began, somewhat after the fashion of Job's—"a great wind from the wilderness smote the four corners" of the fortress, and threatened to leave poor Cacciatore alone to tell the tale; and he seems to have had to put up with not a little "chaff" from his comforters as to his selection of a site; but he consoles himself with the thought that it would have been all the same if he had settled anywhere else.

Then follows a little paragraph about the English, which I may as wall translate:—"Meantime the most enlightened Prof. Adams, together with several of the numerous English Commission—others having remained in Catania—escaped from the misfortune of the *Psyche*, a magnificent steamer of the British Navy, stranded amongst the coasts of Acireale, arrived in Augusta for the observation of the phenomenon. Colonel Porter, of the Engineers, accompanied by soldiers of the same arm, having preceded them, visited our temporary establishment, passed graceful encomiums on the organisation, and planted tents and barracks (huts) at the foot of our fortress, and at the extremity of the open space which divided it from the town. With these distinguished gentlemen we maintained such friendly and cordial relations as are becoming between the citizens of cultivated and free nations."

The incidents of the three or four days preceding the eclipse, and the anxieties caused by the weather, are told with a graphic vividness that will cause those of us who were there to live over again through that period of painful suspense, a suspense only less felt by the English because of the demands made on their energies by the hurry and hard work of preparation. For we had to do in a five days' encampment in a foreign country what they very reasonably employed more than a month to do in their own. After describing the fitful changes of the wind, clouds, and barometer, which kept them oscillating between hope and dread up to the very beginning of the eclipse, he says: "And just then the sun appeared radiant and luminous, so as to provoke a cry of joy from as many as stood intent to observe him. So it went on until the moment of totality; but then some clouds began to traverse the obscured disc, and so rapid was their movement and their succession one after another, that they influenced the degree of visibility to each one of the observers in a different sense, and in such a fashion that there were some of them more fortunate and others less so." This admirably careful description corresponds perfectly with our own experience, and should be duly taken into account when the value of the observations comes to be considered. Cacciatore's own estimate of the work done, an estimate formed on the spot immediately after the eclipse, when he came to review his company, is expressed in reserved and general terms as follows:—"I was able to satisfy myself that alhough the sky was not largely propitious, it nevertheless conceded to us a certain interval, the fruits of which had been reaped to the utmost; and that if in general the observations of the eclipse of 1870 turned out unfortunate, the Augusta division would be able to supply facts which would not be without importance in the present state of science."

He then proceeds to summarise the results as follows:—

"Padre Secchi had assumed the photographic department, and the spectroscopic determination of the protuberances previous to the eclipse, with the view of being able to compare them with those which should be seen during the totality. The position and the shape of these were obtained on the morning of the same day, favoured by a fine serene sky. Ten photographs were made during the phases, and at the moment of totality photographs of the protuberances were obtained, in spite of the obstacle of a cloud. At the same time their forms were directly noted, and immediately afterwards were confronted with the spectroscopic figures. The spectrum of the most acute cusps of the sun was studied, and photographs of the later phases were taken until the end of the eclipse.

"Prof. Denza made spectroscopic observations of the corona, which discovered two bright lines, one near the E, the other probably of nitrogen (*dell' azoto*). Together with Signor De Lisa they observed and drew the protuberances.

"Prof. Donati in the time of totality was able to see the bright lines of one protuberance already studied before the eclipse. He saw the lines of hydrogen and one line in the yellow more refrangible than the sodium, but did not see any of the iron lines.

"Prof. Blaserna examined whether the corona contained polarised light. Employing a Savart polariscope applied to a refracting telescope of moderate magnifying power, he was able to examine three points situated at 45° from each other. The polarisation was most pronounced, and very nearly of the same intensity as the atmospheric polarisation seen recently on clear days at about 50° from the sun. At the distance of a degree and a half from the moon not a trace of polarisation was seen, the influence of the air, therefore, in the observed phenomenon remains eliminated. The plane of polarisation was found in all the points radial or tangential to the sun's limb. It remains then established that the corona is polarised, and hence contains reflected light sent out from the photosphere.

"The purely astronomical part assigned to me (the director) was, as far as the variable condition of the heavens admitted, fulfilled to the best of my ability. I was able, in fact, to note with some precision the instants of first contact, and the beginning of totality and the end of it (although the last through the clouds), besides some other observations which I shall refer to afterwards."

This summary concludes with a mention of the magnetic and meteorological observations, and the Professor goes on to remark concerning the station at Terranova, that the circumstances there were not dissimilar to those at Augusta—the same strong wind and clouds interfered as at the latter place.

Thus ends the general account of the operations described by the leader of the expedition—a most interesting introduction, and well worthy of the seven independent papers from Augusta which follow it, to which are added about the same number from Terranova, and some dozen more abridged accounts by outsiders, which form an appendix.

The leading place is accorded to that most accomplished of ecclesiastics, Father Secchi, who, in his ringing and trenchant style, gives a vivid picture of the whole experience, from the ordering of the instruments to the ultimate effect of the phenomenon. Next follows Donati, "in a speech curt tuscan, sober, expurgate, spare of an 'issimo,'" as Robert Browning says, in which the blunt but attractive manners of that genial soul are nearly as appreciable by the reader as if he were present in the flesh. After him Cacciatore details his own observations in his gracefully fluent yet finished style, and then come Blaserna's polariscopic experiments, clearly and energetically expressed, and, as far as I can judge, affording most conclusive results. It is not a little remarkable how much is contributed towards the value of the observations by the manner in which each observer relates them. The descriptions are given with such charming naïveté and absence of affectation, that the reader can appreciate almost the exact degree in which the writer's hand shook as he manipulated his instrument, not to speak of the degree in which his assertions can be relied upon for accuracy or freedom from bias.

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* When it came to the knowledge of this gentleman (through the ever attentive Secchi) that our military escort, in consequence of "superior orders," had taken away our tents, and left us without shelter upon the open glacis at Augusta, he sent us a polite message, placing his ship at our service in the handsomest manner.

JOHN BRETT

NOTES

M. JANSSEN has been elected a member of the Astronomical Section of the French Academy, the votes recorded for him being 42, against 13 for M. Loewy, and 1 for M. Wolff.

AT a recent meeting of the Natural Science Section of the Literary and Philosophical Society of Sheffield, a discussion took place on "The Attitude of the State to Science," in which Dr. Hime, Mr. Alfred H. Allen, Mr. H. C. Sorby, F.R.S., and Mr. J. Spear Parker successively took part, and the opinion of the meeting was embodied in the following resolution, which was passed unanimously:—"That this meeting deplores the supineness of the Government with respect to science, and believes that the national recognition of research, and the establishment of better means of rewarding discoverers, would be a direct benefit to the country."

IN order to remove any apprehension that might arise in the minds of some members of the Anthropological Institute (particularly of those residing in the country), from statements made that, in consequence of the recent change in the composition of the Council, a preference would be given to papers of an ethnographical class over those relating to other branches of anthropology, the director, with the full concurrence of the president, has thought it advisable to assure the members of the Institute that no such result need be feared. Papers on every branch of anthropology will always be cordially received, provided they comply with the requirements demanded in all communications to a Scientific Society intended for publication, amongst which, a very essential one is, that they should contain either "new facts or new applications of admitted facts." As a further assurance that all proper subjects will receive due and equal attention, it may be well to state in general terms what may be regarded as proper subjects to be brought before the Anthropological Institute. They may be included under the following heads:—(1) The Physical History of Man and of the Human Race; (2) Psychology; (3) Comparative Philology; (4) Priscan Archæology, *a* Prehistoric, *b* Protohistoric; (5) Descriptive Ethnography, comprising the Reports of Travellers and Explorers on the Physical Characters, Derivation and Relation, Manners, Customs, Religion, Language, &c., of various Races or Nations; (6) Comparative Ethnography; (7) The Relations between Civilised Man and Aboriginal Savage Peoples. In this programme it will be seen that any subject properly coming under the cognizance of the anthropologist may find a place. And in order to insure confidence that each and every subject will receive due attention, it is suggested that committees might, if thought desirable, be formed of such members of the institute as may take a special interest in any of the above branches of inquiry, whose function would be, each in its own sphere, to promote the collection of materials and the production of papers relating to the subject in which they may feel particular interest. In this way it is clear that all the subjects will be placed on an equality, and to be hoped that each in its turn will receive the same attention.

SOME weeks ago we expressed a hope that the vacant Swiney Lectureship would not be given to one who is already well off, but to some well-qualified young man, who would thus have leisure to perform work of high scientific value. Our hope, we are glad to see, has been essentially fulfilled in the appointment of Dr. Carpenter, who, unusually young in spirit, assuredly deserves the leisure which this appointment will ultimately help to bring him, leisure which, we have good reason to believe, will be devoted to the completion of work of very high scientific value indeed. Few men have devoted gratuitously more of their time to the public benefit, and we believe that he accepts the appointment mainly in order that he may have a good opportunity of working out in fuller detail the applications to geology of the inquiries in which he has been engaged during the last few years. Dr. Carpenter, we understand, has had by him for years, the material, fully worked out, of important papers which he has had no time to produce. Dr. Carpenter has once before held the Swiney Lectureship, and it has been offered to him again without any solicitation on his part.

ON Monday last, in the first of his Hunterian lectures for this year, Prof. Flower drew special attention to the peculiarities of a new animal discovered by Prof. Marsh, of Yale College, and named by him *Dinoceras mirabilis*. This remarkable ungu alte, nearly the size of the elephant, was obtained from the Eocene beds of the Rocky Mountain region. It possessed osseous cores for three pairs of horns, which rise successively one above the other; a supra occipital crest is greatly developed, projecting obliquely backward beyond the condyles. The posterior pair of horns arise from this crest, the median from the maxillaries, and the anterior from the tips of the nasals. The canines are greatly developed, and the upper incisors are wanting. The skull is unusually long and narrow, and carries six small molar and premolar teeth. The extremities resembled very nearly those in the proboscidia, but were proportionately shorter. The femur possessed no third trochanter and no pit for the ligamentum teres. It therefore possesses characters allying it with the perissodactyles as well as the proscidia.

PROF. MARSH has also drawn attention to a new sub-class of fossil birds from the cretaceous shales of Kansas. The specimens, while possessing the scapular arch, wing, and leg-bones of the truly orthnithic type, present the very aberrant conditions of having biconcave vertebræ and well developed teeth in both jaws. These teeth are quite numerous and implanted in distinct sockets; the twenty in each ramus of the lower jaw are inclined backwards and resemble one another. The maxillary teeth are equally numerous and like those in the mandible. The sternum have a carina and elongated articulations for the coracoids. The lower of the posterior extremities resemble those of swimming birds. The last sacral vertebra is large, so it may have carried a tail. Professor Marsh proposes the name *Odontornithes* for the name of the new sub-class, and *Ichthyonithes* for the order to contain this remarkable species, which is about the size of a pigeon.

AT a meeting of the Senate of the University of London held last week, a resolution was passed by a majority of two, that it is desirable to make Greek an optional subject at the Matriculation Examination. The practical effect of the carrying out